

What is claimed is:

1. A semiconductor device comprising:

a semiconductor chip having a main surface provided with an integrated circuit including a photoelectric converter;

5 a first wiring for electrically connecting the integrated circuit of the semiconductor chip to respective external terminals;

a sealing resin for sealing the main surface of the semiconductor chip and the first wiring, formed so as to have an opening over the surface of the integrated circuit; and

10 a light-transmitting cap for covering the opening of the sealing resin.

2. A semiconductor device according to claim 1, further comprising a plurality of electrodes columnar in shape, formed in the vicinity of the periphery of the integrated circuit, and provided with a step at the top surface thereof, serving as the first wiring, wherein the light-transmitting cap is engaged with the step at the respective top surface of the electrodes while covering the opening in the sealing resin.

20 3. A semiconductor device according to claim 1, wherein the light-transmitting cap is provided with a second wiring for connecting the first wiring to the respective external terminals;

4. A semiconductor device according to claim 1, wherein a protection film having an opening is provided over the main surface of the semiconductor chip and wherein the opening is positioned over the main surface of the semiconductor chip.

5. A semiconductor device comprising:

- a semiconductor chip which has a main surface provided with an integrated circuit including a photoelectric converter;
- 10 a plurality of electrode pads which is formed on the main surface;
- a plurality of first wiring patterns each of which has one end connected to the corresponding electrode pad and the other end;
- a plurality of bump electrodes each of which has a bottom surface contacting with the one end of the corresponding first wiring pattern and a top surface;
- 15 a sealing resin which seals surfaces of the first wiring patterns, sides of the bump electrodes, wherein the electrode pads, the first wiring patterns, the bump electrodes and the sealing resin are positioned at periphery of the semiconductor chip;
- 20 a plurality of external terminals each of which is formed on the top surface of the corresponding bump electrode; and
- a light-transmitting cap which is provided on the top surfaces of the

bump electrodes so as to cover a center of the semiconductor chip.

6. A semiconductor device according to claim 5, wherein some of the bump electrodes have steps at the top surfaces thereof, wherein the  
5 light-transmitting cap is engaged with the steps at the top surfaces of the bump electrodes.

7. A semiconductor device according to claim 5, further comprising second wiring patterns which connect the bump electrodes to the respective  
10 external terminals and which are formed on the light-transmitting cap.

8. A semiconductor device according to claim 5, further comprising a protection film having an opening which is provided over the main surface of the semiconductor chip and wherein the opening is positioned over the main  
15 surface of the semiconductor chip.

9. A semiconductor device according to claim 5, wherein the bump electrodes are arranged in a matrix form.

20 10. A semiconductor device comprising:

a semiconductor chip which has a main surface provided with an integrated circuit including a photoelectric converter;

a plurality of electrode pads which is formed on the main surface;

a plurality of redistribution wiring patterns each of which has one end connected to the corresponding electrode pad and the other end;

a plurality of bump electrodes each of which has a bottom surface  
5 contacting with the one end of the corresponding redistribution wiring pattern and a top surface;

a sealing resin which seals surfaces of the redistribution wiring patterns, sides of the bump electrodes, wherein the electrode pads, the redistribution wiring patterns, the bump electrodes and the sealing resin are  
10 positioned at periphery of the semiconductor chip;

a plurality of external terminals each of which is formed on the top surface of the corresponding bump electrode; and

a light-transmitting cap which is provided on the top surfaces of the bump electrodes so as to cover a center of the semiconductor chip.

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11. A semiconductor device according to claim 10, wherein some of the bump electrodes have steps at the top surfaces thereof, wherein the light-transmitting cap is engaged with the steps at the top surfaces of the bump electrodes.

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12. A semiconductor device according to claim 10, further comprising wiring patterns which connect the bump electrodes to the

respective external terminals and which are formed on the light-transmitting cap.

13. A semiconductor device according to claim 10, further  
5 comprising a protection film having an opening which is provided over the main surface of the semiconductor chip and wherein the opening is positioned over the main surface of the semiconductor chip.

14. A semiconductor device according to claim 10, wherein the  
10 bump electrodes are arranged in a matrix form.

15. A semiconductor device comprising:  
a semiconductor chip provided with an integrated circuit formed on a surface thereof;  
15 a first wiring electrically connected to the integrated circuit of the semiconductor chip; and  
a light-transmitting sealing resin sealing the semiconductor chip and the first wiring.